GYPSUM

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Pure gypsum is a white-to-transparent mineral, though impurities can give the mineral a gray, brown, or pink coloration. Its chemical name is calcium sulfate dihydrate, and its chemical formula is $CaSO_4 \cdot 2H_2O$. When gypsum is heated, it loses approximately three-quarters of its water and becomes hemihydrate gypsum ($CaSO_4 \cdot \frac{1}{2}H_2O$), which is soft and can easily be ground to a powder called hemihydrate gypsum plaster or plaster of paris. If the powder is mixed with water to form a slurry or paste, it will dry and set rock hard. As the plaster-water mixture dries, water will chemically recombine with the hemihydrate gypsum, and the material will revert back to the original composition of gypsum. While the hemihydrate gypsum plaster is in slurry form, it can be poured between two paper and adhesive layers to make wallboard, poured into molds, or used to fill cracks and crevices. Gypsum makes an ideal building material because it is abundant, economical, fire resistant, strong, and versatile. It can also reduce the transmission of sound, and its use can have other environmental benefits, such as reducing waste delivered to landfills.

Gypsum has been known for centuries as a building material. The earliest known use of gypsum as a building material was in Anatolia around 6000 B.C. Gypsum has been found on the interiors of the great pyramids in Egypt, which were erected in about 3700 B.C. Gypsum is found on every continent in the world and is one of the most widely used minerals. Gypsum mines are located all across North America, and some Western States contain huge deposits of powdery gypsum rock.

Synthetic gypsum is generated as a byproduct in flue-gas desulfurization (FGD) systems used to reduce sulfur dioxide emissions from coal-fired electric powerplants. These FGD systems not only keep the air clean, but, they also can provide a sustainable, ecologically sound source of very pure gypsum. Synthetic gypsum also is generated by various other acid-neutralizing processes.

In the United States, most gypsum is used to manufacture wallboard and plaster for homes, offices, and commercial buildings. An average new American home contains more than 7.31 metric tons (t) of gypsum or, in other terms, more than 571 square meters (6,144 square feet) of gypsum wallboard (Mineral Information Institute, 2001). Worldwide, gypsum is used in portland cement, which is used in concrete for bridges, buildings, highways, and many other structures that are part of our everyday life. Gypsum also is extensively used as a soil conditioner on large tracts of land in suburban areas and in agricultural regions.

Production

The gypsum industry of the United States produced 6.4% more crude gypsum in 2003 than in 2002. Calcined gypsum production increased by 9.6% in 2003 compared with that of 2002. The use of synthetic gypsum increased to almost 32% of total gypsum consumption in 2003. That was up from just under 30% of total gypsum consumption in 2002. The use of synthetic gypsum from FGD is expected to continue to increase as more coal-fired powerplants convert their desulfurization processes to produce marketable gypsum and as more wallboard plants are constructed near these powerplants. Mutually beneficial relationships between powerplant operators and wallboard manufacturers have been the foundation for both industries to undertake the costs of converting old plants and constructing new facilities. Additional wallboard plants based on using FGD as a high-grade and consistent gypsum source have been planned by several wallboard manufacturers. The percentage of gypsum consumption consisting of synthetic gypsum should continue to rise as facilities come onstream next year and in the future.

Gypsum industry data for this report are collected by the U.S. Geological Survey (USGS) from semiannual and annual surveys of gypsum operations and from monthly statistics provided by the Gypsum Association of Washington, DC. In 2003, the USGS annual survey canvassed 110 gypsum production operations that accounted for all known domestic output. This survey response rate was approximately 88%. The output of the producers who did not respond to the survey was estimated from previous years survey responses.

The United States continued to lead the world in gypsum production in 2003, accounting for about 16.4% of reported global output. During 2003, domestic output of crude gypsum increased by 6.4% from 2002 to about 16.7 million metric tons (Mt) valued at $114 million (table 1).

Crude gypsum was mined by 22 companies in the United States at 45 mines in 17 States. More than 77% of the gypsum produced was mined by 5 companies at 29 mines. The top gypsum producing States in 2003, in descending order, were Oklahoma, Iowa, Nevada, Colorado, Texas, California, and Indiana. These 7 States, with 30 mines, each produced more than 1 Mt and together accounted for 12.8 Mt or 77% of the total domestic output of gypsum (table 2).

The U.S. gypsum industry consisted primarily of a few large, vertically integrated companies that mined gypsum and manufactured wallboard, plaster, and other gypsum products. Companies with the most mines were U.S. Gypsum Corporation with nine mines; National Gypsum Company, six mines; Georgia-Pacific Corporation, six mines; BPB America Inc., five mines; and American Gypsum Company with three mines. These companies produced almost 77% of the total U.S. crude gypsum. The 10 largest gypsum mines in the United States accounted for almost 65% of domestic output in 2003. These 10 mines were owned by 6 companies, and their average output was 841,000 t.

During 2003, gypsum was calcined (partially dehydrated by heating) at 59 plants operated by 7 companies in 30 States, principally to produce feedstock for wallboard and plaster manufacturing plants. The leading calcining States in 2003, in descending order, were California, Florida, Arkansas, Texas, Nevada, Iowa, and Indiana. These 7 States, with 32 plants, each produced more than 1 Mt of calcined gypsum and together accounted for more than 51% of national output (table 3). In 2003 domestic output of calcined gypsum increased by 8.8% to 20.4 Mt valued at more than $400 million.

Companies, including subsidiaries, with the most calcining plants were U.S Gypsum with 21 plants; National Gypsum, with 15 plants; Georgia-Pacific with 14 plants; and BPB, 6 plants. These companies produced nearly 92% of the national calcined gypsum output. The 10 largest calcining plants in the United States accounted for more than 35% of production in 2003. These plants were owned by 6 companies, and the average output of the plants was 577,000 t.

In addition to mined gypsum production, synthetic gypsum was generated as a byproduct of various industrial processes. The primary source of synthetic gypsum was FGD at coal-fired electric powerplants. Smaller amounts of synthetic gypsum were derived as a byproduct of chemical processes, such as acid neutralization processes, citric acid production, sugar production from sugar beets, and titanium dioxide production. Synthetic gypsum was used as a substitute for mined gypsum, principally for wallboard manufacturing, agricultural purposes, and cement production. In response to USGS surveys, 5 companies operating in 5 States reported that more than 3.1 Mt of synthetic gypsum generated by industrial processes at their mines and plants was sold or used in 2003. In addition to these companies, 18 domestic coal-fired electric powerplants generated approximately 12.0 Mt of synthetic gypsum from their FGD systems during 2003 (American Coal Ash Association, 2004§[1]).

About 8.3 Mt or 71% of all synthetic gypsum generated by domestic coal-fired electric utility FGD systems was used in 2003 compared with 68% in 2002. Of the 11.6 Mt of synthetic gypsum used during the year, about 93% was used for wallboard production, 5% was used in cement and concrete manufacture, and about 2% was used for agricultural purposes (Carl Togni, American Coal Ash Association, written commun., 2003). Phosphogypsum is another industrial byproduct derived from manufacturing fertilizer. At present, phosphogypsum is not used in wallboard manufacturing because of the presence of radionucleides, which give off radon, a radioactive gas, when they decay.

During 2003, 9 companies manufactured gypsum wallboard at 79 plants in the United States. Wallboard shipments in 2003 were approximately 3.08 billion square meters (33.3 billion square feet) representing an increase of about 11.3% from 2002. This 3.08 billion square meters represents 86% of the total domestic wallboard production capacity (Gypsum Association, 2002, 2003).

During 2003, several new wallboard and plaster plants became operational, providing additional production capacity and replacing older, less efficient manufacturing facilities. Most of the new wallboard plant capacity constructed in the United States during 2003 depended entirely on synthetic gypsum generated by FGD systems. The FGD systems operated by electric utilities generated high-quality, low-cost synthetic gypsum. Some gypsum companies have taken advantage of this excellent supply source and have located their new facilities to take advantage of FGD gypsum. Gypsum companies also have expanded synthetic gypsum use at existing wallboard plants. At least a dozen wallboard plants in the United States already are using some synthetic gypsum to augment their feedstock from gypsum mines (Sharpe, 2003).

A portion of the gypsum waste generated every year by wallboard manufacturing, wallboard installation, and building demolition is recycled. Gypsum waste generated by the wallboard manufacturing process can be recycled easily. The gypsum core and paper covering are disaggregated and fed back into the raw material stream along with new material. New construction and renovation also generates wallboard scrap. Of recycled gypsum, 10% to 12% comes from construction and renovation scrap. The costs of wallboard scrap disposal in solid waste landfills are increasing. Wallboard scrap from new construction may be ground and used as a soil conditioner, and in some cases, wallboard scrap from new construction may be returned to a plant for recycling (Sharpe, 2003). Other potential markets for recycled gypsum waste are in cement production, as a stucco additive, in sludge drying, in water treatment, in grease absorption, and for marking athletic fields (Turley, 1998; California Integrated Waste Management Board, 2000§).

Consumption

Most of the gypsum consumed in the United States is used for the manufacture of wallboard for the construction industry. Several companies have introduced new wallboard products with improved performance, mold and moisture resistance, and fire retardation. Wallboard for exterior sheathing has also been developed (Sharpe, 2003).

Apparent domestic consumption (defined as mine output plus reported synthetic gypsum used plus imports minus exports plus adjustments for industry stock changes) was nearly 36.6 Mt in 2003 (table 1). This was about a 9% increase in U.S. gypsum consumption compared with that of 2002. Domestic sources (mining plus an estimated 8.5 Mt of synthetic gypsum) met more than 77% of domestic consumption; imports satisfied the remaining needs. In 2003, nearly 32% of the gypsum consumed in the United States came from synthetic sources compared with about 30% in 2002.

Gypsum output is categorized as either calcined or uncalcined (table 4). Calcined gypsum was produced domestically from crude gypsum to manufacture wallboard and plaster products. Uncalcined gypsum, used for portland cement production and agriculture, accounted for virtually all remaining consumption during the year.

In 2003, nearly 40% of the calcined gypsum used to manufacture wallboard was consumed in the production of regular ½-inch wallboard. Fire-resistant wallboard, mobile-home board, water- and moisture-resistant board, lath, veneer base, and sheathing composed most of the balance (table 5). Metropolitan areas in the South Atlantic (Delaware, the District of Columbia, Florida,

[1]References that include a section mark (§) are found in the Internet References Cited section.

Georgia, Maryland, North Carolina, Virginia, and West Virginia), the East North Central (Illinois, Indiana, Michigan, Ohio and Wisconsin), the Pacific (Alaska, California, Hawaii, Oregon, and Washington), and the West South Central (Arkansas, Louisiana, Oklahoma, and Texas) U.S. Bureau of Census Divisions (in decreasing order) were the leading sales areas for gypsum wallboard products in 2003.

During 2003, nearly 3,250 Mt, or almost 83%, of the uncalcined gypsum consumed in the United States was for portland cement production; the remainder, 689 Mt, was used primarily in agriculture. Gypsum, which is added to cement to retard its setting time, accounted for about 2% to 6% by weight of cement output (Roskill Information Services Ltd., 2004, p. 294). Finely ground gypsum rock was used in agriculture and other industries to neutralize sodic soils, to improve soil permeability, to add nutrients, to stabilize slopes, and to provide catalytic support for maximum fertilizer benefits. Small amounts of high-purity gypsum also were used in a wide range of industrial operations, including the production of foods, glass, paper, and pharmaceuticals.

Prices

In 2003, the average values (free on board, mine or plant) reported by U.S. producers were $6.90 per metric ton for crude gypsum and about $20.00 per ton for calcined gypsum. The average value for plaster reported by domestic producers during the year was $15.13 per 100 kilograms ($6.86 per 100 pounds). In 2003, the average value of uncalcined gypsum used in agriculture and in cement production was about $17.40 per ton.

During 2003, prices for gypsum wallboard generally increased in response to increased demand. Prices for regular ½-inch wallboard rose in 14 of the 20 major U.S. metropolitan areas that were sampled, remained the same in 4 of the 20, and decreased in only 2 of the 20. The changes in prices for each metropolitan area ranged from an increase of $45.00 per 100 square meters ($42.00 per 1,000 square feet) to a decrease of $3.23 per 100 square meters ($3.00 per 1,000 square feet). Prices in these 20 U.S. cities ranged from $189.00 to $301.00 per 100 square meters ($175.00 to $280.00 per 1,000 square feet) at yearend. The average of the prices in these 20 U.S. cities was $226.00 per 100 square meters ($209.65 per 1,000 square feet) in January and $215.00 per 100 square meters ($199.44 per 1,000 square feet) at yearend. This represented an overall increase in price of 4.9% from beginning to end of 2003 (Engineering News-Record, 2003a, b).

Foreign Trade

In 2003, the United States was the world leader in the international trade of gypsum and gypsum products. The U.S. imported crude gypsum from 10 countries and exported gypsum wallboard to 69 countries and territories (tables 6 and 7). Only a small amount of crude gypsum was exported by the United States in 2003.

Net imports of crude gypsum in 2003 increased by 4.1% from those of 2002 and accounted for 24% of apparent consumption. Much of this import dependence can be attributed to the lack of adequate domestic gypsum resources near large east coast wallboard markets. Canada and Mexico accounted for more than 90% of imported gypsum, while Spain supplied most of the remainder. Imports primarily supplied wallboard plants in coastal markets; most imports from Canada went to east coast plants, and Mexican sources chiefly served the west coast. Foreign subsidiaries of U.S. gypsum companies produced much of the gypsum that was imported for the wallboard plants. Most of the crude gypsum imported by the U.S. from Mexico is produced by Compania Oriental de Mineralres S.A. and Compania Mineria Coapas S.A in Baja, California (Sharpe, 2004). Almost all gypsum imported from Canada came from Nova Scotia. Smaller amounts of imported gypsum were used in portland cement production. The completion of large wallboard manufacturing plants near powerplants near the eastern seacoast may affect gypsum imports in the future.

Wallboard exports, totaling about 5.6 million[2] square meters (60 million[2] square feet) and valued at $39.3 million, went primarily to countries and territories in Asia, Europe, and Latin America. Wallboard imports were about 53.9 million square meters (581 million square feet) valued at $59.6 million.

World Review

In 2003, 89 countries produced gypsum, 9 of which accounted for approximately 71% of the total world production (table 8). Global natural gypsum production in 2003 is estimated to be more than 102 Mt. More than 200 million metric tons per year of synthetic gypsum (mostly phosphogypsum) is generated worldwide (Roskill Information Services Ltd., 2004, p. 20). However, only a small portion of that gypsum was consumed. The high demand for gypsum in the United States by the domestic construction industry was not matched abroad, with the exception of Canada and Mexico, which export to markets in the United States. Worldwide, the leading use of gypsum is in the manufacture of cement and concrete, accounting for 50% to 60% of all consumption. The estimate for world production of gypsum is probably lower than actual production because gypsum producers in some countries make other products onsite and do not report the gypsum used in these products as gypsum production. Additionally, production from small deposits in developing nations was intermittent and in many cases may not have been reported.

As a low-value, high-bulk commodity produced from deposits widely distributed throughout the world, gypsum tends to be consumed within the country in which it is mined. Less than 20% of the world's crude gypsum production was estimated to have entered international trade. Only a few countries, such as Canada, Mexico, Spain, and Thailand, were major crude gypsum exporters;

[2]Revised on February 11, 2005.

of these, Canada and Mexico are significant gypsum exporters because of their proximity to large U.S. wallboard markets. Only 166,000 t of crude gypsum was exported from the United States.

Although use of gypsum wallboard increased worldwide, only industrialized nations, such as the United States, used gypsum primarily for wallboard products. In developing countries, especially in the Middle East and Asia, most gypsum was used in the production of cement or as a plaster product.

Estimated world production capacity for gypsum wallboard in 2003 exceeded 7.8 billion square meters per year (about 84 billion square feet per year) at more than 250 plants worldwide. Almost one-half of this capacity was located in the United States. Asia and Western Europe each accounted for about one-fifth of estimated world production capacity. Construction or expansion of dozens of wallboard plants was underway during the year in many countries, and as in the United States, the use of synthetic gypsum by other industrialized nations increased.

Belgium and Netherlands.—BPB completed its acquisition of a controlling interest in Gyproc Benelux in Europe in early 2003. The acquisition of the plasterboard and plaster business of Etex Gypsum in Belgium and the Netherlands increased BPB's equity share in Gyproc to 99% from 46%.

Brazil.—Gypsum production in Brazil declined slightly in 2003 from that in 2002. This decline was attributed to a large drop in the civilian construction sector. Production of gypsum in Pernambuco State in eastern Brazil was 23 Mt and accounted for 95% of the national output. While gypsum production decreased in 2003, the price in Brazil increased by about 10% (Sharpe, 2004).

Canada.—Canada continued to be the second leading North American producer of gypsum. Canadian production totaled 8,850 Mt, just slightly more than in 2002. Approximately 64% of Canadian production was exported to the Eastern United States (Sharpe, 2004).

Germany and Poland.—BPB sold Gyproc's plasterboard business in Germany and Poland to the Lafarge Group. The net acquisition cost was €54.9 million, and BPB assumed a €24.8 million debt obligation. Lafarge began production in Poland in 2003 with the startup of the Gacki II wallboard plant. This plant reached production capacity of 35 million square meters per year (377 million square feet per year).

Korea, Republic of.—Lafarge introduced a gypsum-based spray plaster for fireproofing beams and columns.

Mexico.—The new quarry and bulk loading facilities of Exploraciones de Yeso began operating in Colima State. This operation shipped a small amount of gypsum to markets in the U.S. Pacific Northwest.

Russia.—Russia is becoming a major producer of gypsum, mostly for domestic consumption. Russia's apparent consumption of gypsum was about 1.4 million metric tons in 2002 and has more than doubled since 1998. Russia's production of plasterboard more than tripled in the same time period with approximately 80 million square meters produced in 2002 (Roskill Information Services, Ltd., 2004).

Thailand.—Lafarge Prestia Thailand will celebrate its tenth anniversary of operation in 2004. Lafarge is the Asian wallboard market leader with 13 plants in 5 countries. Siam Gypsum Industry (SGI), Thailand's leading gypsum board manufacturer, announced that it lost 20% of their export business because of the high antidumping tariff imposed by South Africa on imported products. This loss of business forced SGI to reduce production to 63% of their plants' capacity.

United Kingdom.—The Knauf Group planned to invest £20 million in their Knauf Drywall wallboard manufacturing capacity in the United Kingdom (Sharpe, 2004).

Uzbekistan.—Knauf announced plans for a joint venture with Bukharagips JSC (a division of Uxstroimaterialy) to build a wallboard plant in Uzbekistan. This plant is projected to have a capacity of 7 million square meters per year (75.3 million square feet per year) (Sharpe, 2004).

Outlook

One of the key business indicators used by the wallboard and gypsum industry is the number of new housing starts. Housing starts in North America should continue to rise by approximately 3% per year, while those in Europe may increase by more than 5%. The Asian gypsum market, particularly Japan, also should increase and future demand in emerging Asian markets should be an important factor in gypsum sector growth (Industrial Minerals, 2004). U.S. production and consumption data for 2003 suggest that levels in 2004 should continue to rise slightly or at least match the levels of 2003. Other supply and demand indicators, such as construction rates for new office and commercial buildings and the continuing trend to construct larger homes with more rooms, also are evidence that gypsum production levels will remain near the same level as in 2003.

Implementation of the Transportation Equity Act for the 21st Century (Public Law 105-178, enacted June 9, 1998) for road building and repair through 2003 has been an important stimulus for the domestic cement industry, increasing the demand for gypsum as an integral component of cement. This Act mandated the repair and replacement of bridges, roads, and other components in the transportation infrastructure. The Safe, Accountable, Flexible, and Efficient Transportation Equity Act of 2003 (S. 1072, H.R. 2088), which is expected to be enacted in early 2004, will continue this funding for the building and repair of the Nation's highway system (U.S. Senate, 2003§).

During the next several years, the use of mined gypsum may decline significantly in the United States as greater quantities of synthetic gypsum are used in wallboard manufacturing. Some actual and planned mine closings already have been attributed to substitution by synthetic gypsum. This rate of substitution seems likely to accelerate additional mine closings during the rest of this decade. The expansion of synthetic gypsum production is set to continue in Europe and North America, but it is limited by the diminishing number of coal-fired electric powerplants without FGD systems. Most powerplants built in recent years were natural gas

fired. The trend towards using FGD gypsum as a raw material at the expense of natural product is set to continue as air pollution regulations spread across the globe to include developing nations.

The domestic gypsum industry is undergoing a change on the supply side. The U.S. gypsum industry is changing towards large-capacity wallboard plants supplied with synthetic gypsum from coal-fired powerplants near population which are also areas of high consumption. The older, less efficient and smaller, natural (mined) gypsum-fed plants will find it increasingly difficult to compete and some will close (Harris, 2001).

As a response to increased public awareness, the gypsum industry probably will increase its recycling of scrap materials into raw materials streams. There also will be an increase in the use of ecolabels, such as the Scientific Certification System Green Cross, which certifies there is recycled and recovered content in each product.

Industry trends also indicate significant developments abroad in the coming decade. For example, the pace and magnitude of wallboard plant construction in China indicates that with more than a billion potential consumers, it could become one of the world's leading gypsum wallboard markets. Elsewhere, the extent of wallboard capacity growth in Asia, Central America, Europe, and South America indicates that wallboard manufacturing is likely to become a more significant market for gypsum worldwide.

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TABLE 1
SALIENT GYPSUM STATISTICS[1]

(Thousand metric tons and thousand dollars)

	1999	2000	2001	2002	2003
United States:					
Crude:					
Production:					
Quantity	22,400	19,500	16,300	15,700	16,700
Value	$157,000	$165,000	$119,000	$108,000	$114,000
Imports for consumption	9,340	9,210	8,270	7,970	8,300
Synthetic gypsum sales	5,200	4,950	6,820	9,900	11,700
Calcined:					
Production:					
Quantity	22,300	21,000	19,100	18,600	20,400
Value	$381,000	$353,000	$352,000	$372,000	$400,000
Products sold, value	$3,540,000	$2,860,000	$2,470,000	$2,690,000	$2,880,000
Exports, value	$93,300	$102,000	$96,400	$102,000	$111,000
Imports for consumption, value	$465,000	$269,000	$231,000	$196,000	$184,000
World, production	109,000	107,000 [r]	103,000 [r]	102,000 [r]	102,000 [e]

[e]Estimated. [r]Revised.
[1]Data are rounded to no more three significant digits.

TABLE 2
CRUDE GYPSUM MINED IN THE UNITED STATES, BY STATE[1]

State	2002			2003		
	Active mines	Quantity (thousand metric tons)	Value (thousands)	Active mines	Quantity (thousand metric tons)	Value (thousands)
Arizona and New Mexico	4	459	$3,350	4	581	$3,930
Arkansas, Kansas, Louisiana	4	1,490	15,900	4	2,080	21,100
California, Nevada, Utah	13	3,910	17,300	11	5,070	26,400
Colorado, South Dakota, Wyoming	5	1,030	8,410	5	1,240	10,500
Indiana, New York, Ohio, Virginia	3	1,240	7,460	2	1,090	5,650
Iowa	6	1,920	13,000	6	2,030	13,700
Michigan	3	1,020	10,800	2	500	6,130
Oklahoma	6	2,520	18,500	5	2,250	14,100
Texas	6	2,060	13,400	6	1,810	12,300
Total	50	15,700	108,000	45	16,700	114,000

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 3
CALCINED GYPSUM PRODUCED IN THE UNITED STATES, BY STATE[1]

State	2002 Active mines	2002 Quantity (thousand metric tons)	2002 Value (thousands)	2003 Active mines	2003 Quantity (thousand metric tons)	2003 Value (thousands)
Alabama	1	507	$11,500	1	544	$14,500
Arizona, Colorado, New Mexico, Utah	4	1,070	13,600	3	799	10,400
Arkansas, Louisiana, Oklahoma	6	2,220	40,500	6	2,710	47,300
California	6	1,980	35,900	6	2,070	40,500
Maryland, North Carolina, Virginia	4	1,110	28,000	4	1,210	31,200
Florida	3	1,570	41,900	3	1,560	42,100
Georgia	1	190	4,810	2	474	8,610
Illinois, Indiana, Kansas	6	1,890	33,700	6	1,950	36,400
Iowa	5	1,750	30,800	3	1,290	20,000
Massachusetts, New Hampshire, New Jersey	5	1,210	29,500	5	1,310	34,700
Michigan	3	463	13,700	4	952	17,000
Nevada	2	625	5,090	2	1,390	9,430
New York	2	649	15,900	2	635	16,600
Ohio	3	394	9,140	2	205	4,030
Oregon	1	371	10,600	1	428	12,800
Pennsylvania	1	534	9,450	1	571	12,100
Texas	5	1,330	21,200	5	1,410	19,700
Washington and Wyoming	3	718	16,700	3	863	22,800
Total	61	18,600	372,000	59	20,400	400,000

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 4
GYPSUM PRODUCTS (MADE FROM DOMESTIC, IMPORTED, AND SYNTHETIC GYPSUM) SOLD OR USED IN THE UNITED STATES, BY USES[1]

(Thousand metric tons and thousand dollars)

	2002		2003	
Use	Quantity	Value	Quantity	Value
Uncalcined:				
Portland cement	2,620	32,400	3,250	43,800
Agriculture and miscellaneous[2]	985	23,300	689	24,900
Total	3,600	55,700	3,940	68,700
Calcined:				
Plasters	967	146,000	1,130	165,000
Prefabricated products[3]	28,500	2,480,000	30,200	2,640,000
Total calcined	29,500	2,630,000	31,300	2,810,000
Grand total	33,100	2,690,000	35,300	2,880,000

[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Includes synthetic gypsum.
[3]Includes weight of paper, metal, or other materials and some synthetic gypsum.

TABLE 5
PREFABRICATED GYPSUM PRODUCTS SOLD OR USED IN THE UNITED STATES[1]

Product	2002 Quantity (thousand square feet)	2002 Quantity (thousand metric tons)[2]	2002 Value (thousands)	2003 Quantity (thousand square feet)	2003 Quantity (thousand metric tons)[2]	2003 Value (thousands)
Lath:						
3/8 inch	854	(3)	$241	3,570	3	$1,570
1/2 inch	(3)	(3)	(3)	12,600	8	2,770
Other	(3)	(3)	(3)	11,100	13	3,800
Total	854	(3)	241	27,300	25	8,140
Veneer base	499,000	502	53,600	499,000	497	53,900
Sheathing	237,000	235	28,600	203,000	201	25,100
Regular gypsumboard:						
3/8 inch	2,360,000	2,290	139,000	2,010,000	2,020	114,000
1/2 inch	12,400,000	11,100	1,040,000	14,100,000	11,700	1,110,000
5/8 inch	1,710,000	1,850	97,000	1,880,000	2,040	107,000
1 inch	498,000	555	54,900	494,000	540	55,100
Other[4]	1,270,000	1,350	87,500	1,590,000	1,690	109,000
Total	18,200,000	17,100	1,420,000	20,100,000	18,000	1,500,000
Type X gypsumboard	8,090,000	7,860	676,000	8,630,000	8,500	710,000
Predecorated wallboard	174,000	180	34,200	205,000	215	34,000
5/16-inch mobile home board	546,000	493	63,300	394,000	368	44,500
Water- and moisture-resistant board	1,760,000	1,780	151,000	2,080,000	2,000	174,000
Other	317,000	303	58,100	1,170,000	428	95,600
Grand total	29,900,000	28,500	2,480,000	33,300,000	30,200	2,640,000

[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Includes weight of paper, metal, or other materials.
[3]Less than 1/2 unit.
[4]Includes 1/4-, 7/16-, and 3/4-inch gypsumboard.

TABLE 6
IMPORTS FOR CONSUMPTION OF CRUDE GYPSUM, BY COUNTRY[1]

(Thousand metric tons and thousand dollars)

Country	2002		2003	
	Quantity	Value	Quantity	Value
Argentina	--	--	(2)	4
Austria	--	--	(2)	5
Canada[3]	5,240	43,400	5,700	51,000
Costa Rica	--	--	(2)	30
Dominican Republic	--	--	68	836
Guatemala	--	--	(2)	4
Italy	--	--	(2)	7
Jamaica	10	35	(2)	2
Japan	(2)	12	--	--
Korea, Republic of	(2)	151	--	--
Mexico	1,920	16,700	1,820	16,600
Morocco	(2)	3	--	--
Spain	722	7,320	709	6,930
Sweden	--	--	(2)	3
Thailand	80	1,260	--	--
United Kingdom	(2)	84	(2)	57
Total	7,970	69,000	8,300	75,500

-- Zero.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Less than 1/2 unit.
[3]Includes anhydrite.

Source: U.S. Census Bureau.

TABLE 7
SUMMATION OF U.S. GYPSUM AND GYPSUM PRODUCTS TRADE DATA[1]

(Thousand metric tons and thousand dollars)

Year	Crude[2]		Plasters[3]		Boards[4]		Other, value[5]	Total, value
	Quantity	Value	Quantity	Value	Quantity	Value		
Exports:								
2002	341	16,500	186	31,400	61	33,700	20,200	102,000
2003	166	18,600	161	31,000	50	39,300	21,800	111,000
Imports for consumption:								
2002	7,970	69,000	11	4,740	471	55,800	66,200	196,000
2003	8,300	75,500	6	3,040	484	59,600	45,800	184,000

[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Import and export data are for "Gypsum, anhydrite," Harmonized Tariff Schedule of the United States (HTS) code 2520.10.0000.
[3]Import and export data are for "Plasters," HTS code 2520.20.0000.
[4]Import and export data are for "Boards, sheets, panels, tiles, and similar articles, not ornamented--Faced or reinforced with paper or paperboard only," HTS code 6809.11.0000.
[5]Import and export data are for "Boards, sheets, panels, tiles, and similar articles, not ornamented: Other," HTS of the code 6809.1900.00 and "Other articles," HTS code 6809.90.0000.

Source: U.S. Census Bureau.

TABLE 8
GYPSUM: WORLD PRODUCTION, BY COUNTRY[1, 2]

(Thousand metric tons)

Country	1999	2000	2001	2002	2003[e]
Afghanistan[e]	3	3	3	3	3
Algeria	1,316	1,341	281 [r]	322	350 [3]
Argentina	647	514 [e]	524	372 [r]	363 [p]
Australia[e]	2,500	3,800	3,800	4,000	4,000
Austria[e, 4]	1,000	1,000	1,000	1,000	1,000
Azerbaijan[e]	60	60	60	60	60
Bhutan[e]	54	54	55	55	55
Bosnia and Herzegovina[e]	30	30	30	30	30
Brazil[4]	1,528	1,498 [r]	1,507	1,633 [r]	1,630
Bulgaria[4]	169	170	170 [r]	156 [r]	150
Burma	45	48	65	113 [r]	110
Canada[4]	9,345	9,232	7,821	8,847	8,850
Chile	886	376	517	500	500
China[e]	6,700	6,800	6,800	6,850	6,850
Colombia[e]	560	560	560	560	560
Croatia	138	151	131	135	135
Cuba[e]	130	130	130	130	130
Cyprus	182	260	250	260	260
Czech Republic	136	82	24 [r]	102 [r]	100
Dominican Republic	81	98 [r]	173 [r]	163 [r]	214 [3]
Ecuador	1	1	1	6 [r]	6
Egypt[e, 4]	2,000	2,000	2,000	2,000	2,000
El Salvador[e]	6	6	6	6	6
Eritrea	1	(5)	1 [r]	1 [r]	1
Ethiopia[4]	36	47	51 [r]	51	62
France[e, 4]	4,500	4,500	4,500	3,500	3,500
Germany, marketable[e, 4]	2,500	2,500	2,500	2,500	2,500
Greece[e, 4]	600	600	600	500	500
Guatemala	110	212	100 [e]	100 [r]	100 [3]
Honduras	56	59	60	60 [r]	60
Hungary[e, 4]	203	251	250	250	250
India[e]	2,200	2,210	2,250	2,300	2,300
Indonesia	6	5	6	6	6
Iran[6]	10,834	10,700 [r]	10,890 [r]	10,380 [r]	10,500
Iraq[e]	NA [r]	NA [r]	NA [r]	NA [r]	NA
Ireland	450	450 [e]	450 [e]	450	450
Israel	140	130	133 [e]	144 [r]	140
Italy[e]	1,300	1,300	1,300	1,300	1,200
Jamaica	236	330	320 [r]	165 [r]	175
Japan	5,549	5,917	5,874	5,644 [r]	5,700
Jordan	245	158	163 [e]	176	172
Kenya[4]	10 [e]	8	8	9 [r]	10
Laos	135	132	121 [r]	110 [r]	120
Latvia	97	122	125 [e]	120	120
Lebanon[e]	2 [r]	2 [r]	2 [r]	2 [r]	2
Libya[e]	150	175	150	150	150
Luxembourg[e, 4]	(5)	(5)	(5)	(5)	(5)
Macedonia[e]	30	30	30	30	30
Mali[e]	1	1	1	1	1
Mauritania[e]	100	100	100	100	100
Mexico[4]	6,954	5,654	6,237	6,740 [r]	6,500
Moldova	19	32	32 [e]	32	32
Mongolia[e]	25	25	25	25	25
Morocco[e]	450	475 [r]	550 [r]	600 [r]	600
Namibia	1	1	-- [r]	-- [r]	--
Nicaragua[4]	27	28	28 [e]	28 [r]	31
Niger	2	1	3 [r]	3 [r]	3
Nigeria[e]	500 [r]	530 [r, 3]	610 [r, 3]	300 [r]	100
Oman	180	132	44 [r]	56 [r]	50
Pakistan	245	377	350 [e]	360	360

See footnotes at end of table.

TABLE 8--Continued
GYPSUM: WORLD PRODUCTION, BY COUNTRY[1, 2]

(Thousand metric tons)

Country	1999	2000	2001	2002	2003[e]
Paraguay[e]	4	4	4 [3]	4	4
Peru	76	52	41	75 [r]	71 [3]
Poland[4]	2,023	2,423 [r]	2,228 [r]	2,187 [r]	2,200
Portugal[e, 4]	500	500	500	500	500
Romania	75 [3]	75	75	75	75
Russia	650 [3]	700	700	700	700
Saudi Arabia[e]	380 [3]	400	450	450	450
Serbia and Montenegro	34	47	50	50	50
Sierra Leone[e]	4 [r]	4 [r]	4 [r]	4 [r]	4
Slovakia[4]	117	108 [r]	169 [r]	122 [r]	125
Slovenia[e]	10	10	10	10	10
Somalia[e]	2	2	2	2	2
South Africa	505	413	383	415	394 [3]
Spain[e, 4]	7,500	7,500	7,500	7,500	7,500
Sudan[e, 4]	11 [r]	14 [r]	2 [r]	5 [r]	5
Switzerland[e]	300	300	300	250	250
Syria	394	333	345 [e]	345 [e]	345 [3]
Taiwan	2	2	1	--	-- [3]
Tajikistan[e]	35	35	35	35	35
Tanzania[4]	21	60	72	79 [r]	79
Thailand	5,005	5,830	6,192 [r]	6,326 [r]	6,300 [3]
Tunisia[e]	110	125	125	125	110
Turkey	243	303	324 [r]	264 [r]	270
Turkmenistan[e]	100	100	100	100	100
Uganda	(5)	--	--	(5) [r]	(5)
United Arab Emirates[e]	90	90	90	90	100
United Kingdom[e, 4]	1,800	1,500	1,500	1,500	1,500
United States[7]	22,400	19,500	16,300	15,700	16,700 [3]
Uruguay	1,050	1,076	1,127	1,130 [e]	1,100
Venezuela	42	25	5	10	10
Yemen	103 [3]	100	100	100	100
Zambia[e]	11	10	10	10	10
Total	109,000	107,000 [r]	103,000 [r]	102,000 [r]	102,000

[e]Estimated. [p]Preliminary. [r]Revised. NA Not available. -- Zero.

[1]World totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown.

[2]Table includes data available through July 15, 2004.

[3]Reported figure.

[4]Includes anhydrite.

[5]Less than 1/2 unit.

[6]Data are for years beginning March 21 of that stated.

[7]Excludes byproduct gypsum.